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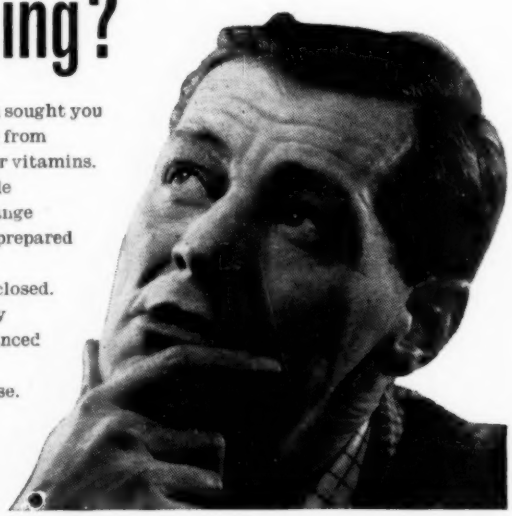

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Atypical Actinobacillosis in a Dairy Herd

BY

H. F. HEBELER
Langport

A. H. LINTON
Department of Bacteriology

AND

A. D. OSBORNE
Department of Veterinary Medicine,
University of Bristol

Introduction

ACTINOBACILLOSIS, as encountered in cattle in this country, is mainly seen as an infection of the tongue, although involvement of the oesophagus, rumen, reticulum, liver and lungs is noted in a small proportion of cases. Norval (1958) reports that in cases seen in the abattoir 60 per cent. show head lesions and 10 per cent. lesions in the stomachs whilst lesions of the skin are rare. Bosworth (1923) isolated *Actinobacillus lignieresi* from the jaw bone of 8 out of 21 heads infected by the organism, it being present in the soft tissues of the remainder, and Phillips (1960a) found *A. lignieresi* in 4 out of 7 bovine mandible lesions. A form of the disease affecting the skin over a large area has been seen on occasions by one of us (A. D. O.) (Fig. 1). Involvement of the lymph nodes of the head is frequently detected in the abattoir and occasional cases involving the tissues of the cheek are seen.

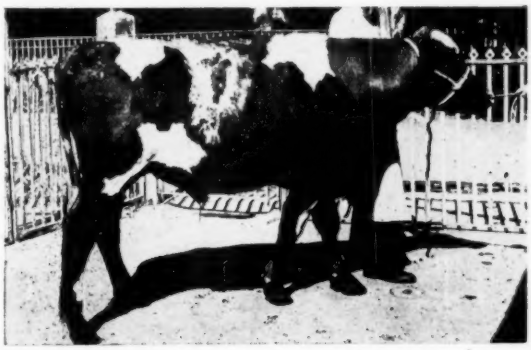


FIG. 1.—Skin actinobacillosis involving extensive area of the right flank of a shorthorn bullock (not in the outbreak described).

In the first record of the occurrence of the condition Lignieres and Spitz (1902) described a much more severe form of the condition than is commonly seen in this country, but reports of similar outbreaks to that described by them have been rare. The condition they described was characterised by a high morbidity (up to 50 per cent.) and significant mortality coupled with a rapidity of spread through herds of grazing animals. There were many indications that the severity of the condition had been accentuated by a preceding epizootic of foot-and-mouth disease, and there was some evidence that whilst the organism isolated at the time of the outbreak was of relatively high virulence, this was rapidly reduced both on passage in the affected herds and in experimental cattle and laboratory animals. In their description of the lesions, the authors noted a high incidence of a so-called skin form in which ulcerating nodules, often of considerable size, developed in the head region—over the maxillae, at the base of the ear, in the intermaxillary space or over the region of insertion of the sternomastoid muscle. The presence of other skin lesions over the ribs, on the flanks, and on the internal surface of the thighs is recorded as occurring in only 2 per cent. of cases.

The outbreak to be described is of interest because of certain similarities to that described by Lignieres and Spitz, though on a much smaller scale. In view of the rare occurrence of this manifestation of the condition in this country we have designated it atypical.

History

The affected animals were members of a largely

self-contained attested Ayrshire herd of 160 animals (75 cows and 85 followers). The herd was of a good commercial type, but at the time of the outbreak none of the animals was in good condition, probably as a result of the previous very dry summer, although yields of milking cows were satisfactory. Milking cows were housed by night in buildings of only moderate structural quality which, however, were kept in extremely clean condition, whilst younger stock were either kept in a covered yard or, in the case of calves, in houses. The covered yard was subdivided by wooded partitions on which a hay rack was fixed. Some of the bolt ends used to fix the partitions to the vertical supports projected into the pens, and the pig netting which formed the free surface of the hay rack had outward pointing wire ends in one of the bays. During the winter dung accumulated in the yard, to be removed in the spring. For the period November to April there was a tendency for these yards to be overcrowded. Calf pens in houses were of a relatively common type with cement rendered brick partitions, and were kept in a moderately good hygienic condition.

During the 4 months December to March inclusive, 11 cases of actinobacillosis were observed, comprising 3 calves of 3 to 5 months of age, 2 yearlings, 5 first calf heifers and one third calf cow. Two months before the first case of this series was noticed, the farmer reported that a second calf heifer showed a subcutaneous swelling in the region of the right supramammary lymph node which ruptured to the surface discharging a light yellow non-odorous pus. No veterinary advice was sought and the lesion healed slowly leaving a subcutaneous fibrous thickening. Despite the presence of moderate to severe local lesions, only one animal showed marked loss of condition, and this was of slow development. No treatment was carried out until veterinary advice had been sought in March, and was then limited as will be described later.

Only one previous case of actinobacillosis, involving the tongue, could be remembered by the owner who had occupied the farm for the previous 15 years. The case had occurred at least 10 years previously.

Lesions

Lesions were distributed as in the diagrams and it is noted that no case involved the tongue (see Diagram 1). Mouth lesions involved the gum adjacent to the teeth except in one animal (462169) where dental pad involvement was associated with lesions in the right external nares (Fig. 2). Gum lesions showed as swollen inflamed areas with numerous small yellow pus foci beneath the mucosa. Those below the incisors tended to protrude as nodules (Fig. 3).

Skin lesions on the head showed as large ulcerated areas from which variable amounts of yellow pus exuded, or, in some cases, as small nodules apparently on the course of lymphatics, draining the skin of the face.

On the chest wall, flanks and thighs, lesions varied in size, but were generally nodular from ½ cm. to 15 cm. in length, and sometimes elongated, sometimes oval or round. Central pointing and rupture of some nodules occurred, yellow pus being discharged. There was relatively little loss of hair, but the cutaneous and subcutaneous tissues were thickened to a varying extent.

Certain of these nodules were arranged in a definite line, either along the course of a lymphatic or, more probably, as a result of an initial scratch which introduced the infection (Fig. 4).

FIG. 2.—Yearling 462169: lesion in right external nares.

FIG. 3.—Lettie: lesion on gum at base of left 2nd incisor and on inside of lip below.

H. F. HEBELER, A. H. LINTON & A. D. OSBORNE—ATYPICAL ACTINOBACILLOSIS IN A DAIRY HERD

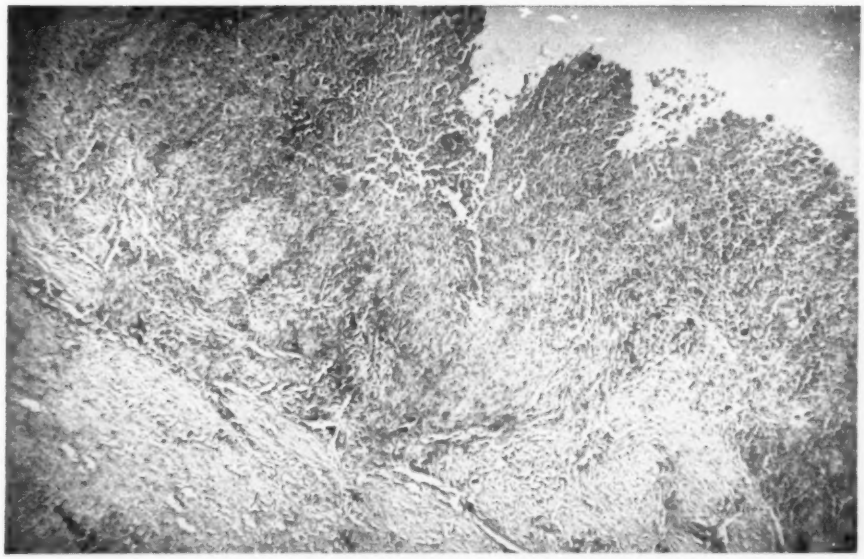


FIG. 5.—Calf 575239: wall of abscess in subcutaneous tissues of left submaxillary region (H. and E. × 55).

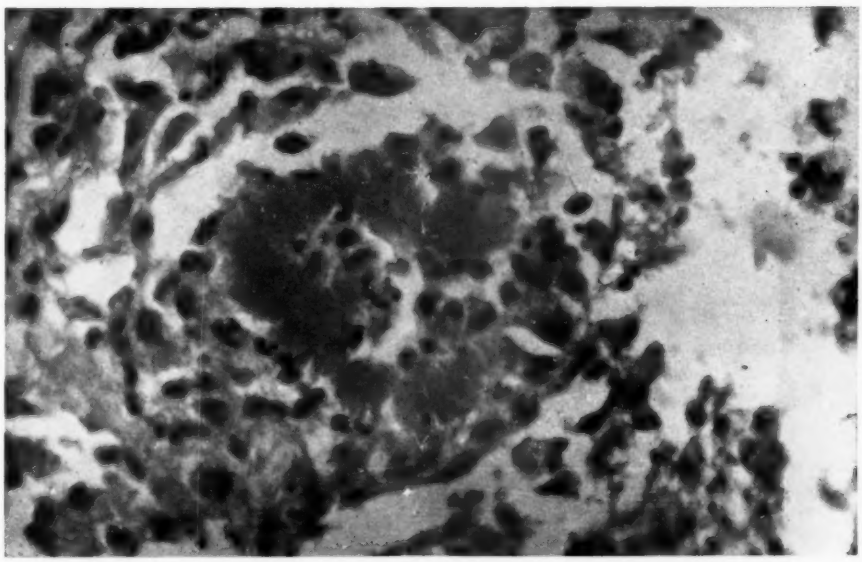
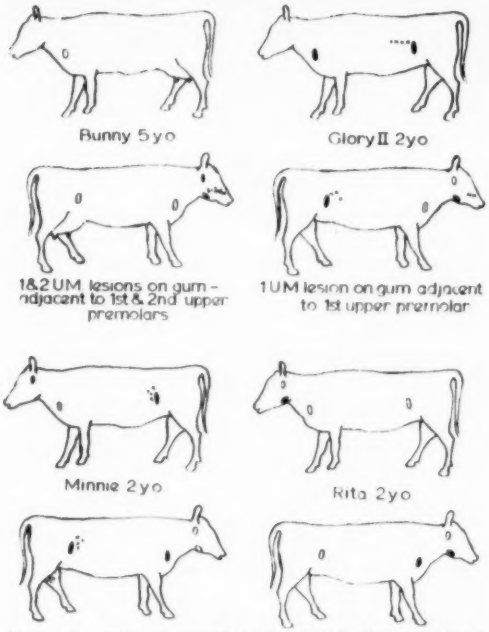
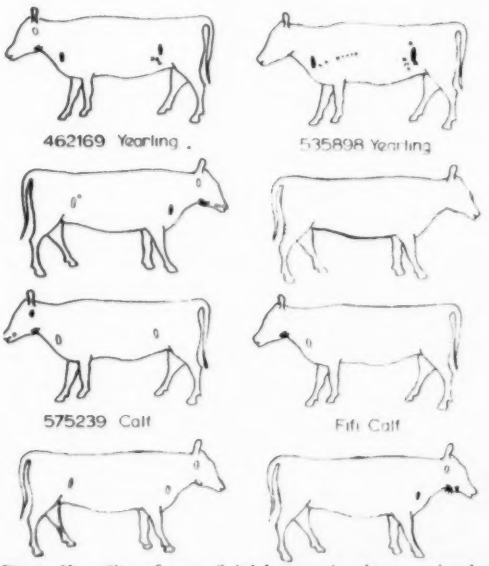


FIG. 6.—As Fig. 5. Showing arrangement of clubs (H. and E. × 605).

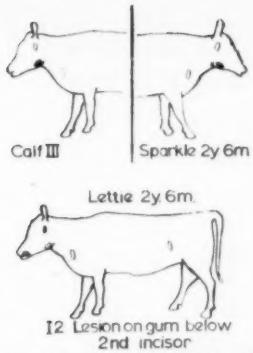

Bunny 5 y o
Glory II 2yo
1&2 UM lesions on gum – adjacent to 1st & 2nd upper premolars
1 UM lesion on gum adjacent to 1st upper premolar
Minnie 2yo
Rita 2yo

DIAG. 1a.—Site of superficial lesions in eleven animals.
● affected lymph nodes.
× site of skin lesions.



DIAG. 1b.—Site of superficial lesions in eleven animals.
● affected lymph nodes.
× site of skin lesions.

In all cases local lymph nodes were involved, the submaxillary or parotid where there were head lesions and prescapular, precrural or popliteal where there were skin lesions. In some cases affected nodes were grossly enlarged, but all were firm, cold and painless to touch.



DIAG. 1c.—Site of superficial lesions in eleven animals.
● affected lymph nodes.
× site of skin lesions.

Diagnosis

In view of the unusual nature of the lesions both bacteriological examination of the exuding pus and histological examination of a nodule biopsy were undertaken. The former revealed an organism which was typically *A. lignieresi*, having the properties described by Phillips (1960b).

Histological examination of the wall of a subcutaneous abscess showed a thick pyogenic membrane consisting of epithelioid cells, lymphocytes, plasma cells and neutrophils lining a fibrous capsule. In the cellular layer were several " rosettes " closely resembling those found in typical tongue lesions though having less evidence of a bacterial grouping centrally and appearing to consist mainly of clubs (Figs. 5 and 6).

The arrangement of the pyogenic membrane resembled that seen by one of us (A. D. O.) in the lesions in the tongue of a dog (Fletcher, Osborne & Linton, 1956).

The organism obtained on culture showed *in vitro* sensitivity to chloramphenicol, chlortetracycline* and streptomycin but was resistant to oxytetracycline† and penicillin.

FIG. 4.—Yearling 535898: lesions in line over shoulder and nodular lesions in precrural area.

* Aureomycin.
† Terramycin.

Serological Examination

Agglutination tests were carried out on 11 samples from affected and 6 non-affected animals in the herd and from a group of 6 calves which were purchases from farms in the Langford area and had no history of having suffered from actinobacillosis. It was felt that extensive infection such as had occurred in some of the animals might have stimulated a higher antibody level than is usual, although it was realised that as high titres are not normally found the test is rarely of diagnostic value. For these tests two isolates of *A. lignieresi* were used as antigens, both from severely affected yearlings (575239 + 535898). The growth on nutrient agar cultures, after 24 hours at 37° C., was washed off in saline, immersed in continuously boiling water for one hour and further diluted with saline to an opacity comparable with No. 1 tube of Burroughs and Wellcome Opacity Tubes. The titres of agglutination obtained with these 2 antigens were virtually identical and only the results obtained with the isolate from animal 575239 are therefore recorded.

TABLE I
RESULTS OF AGGLUTINATION TESTS CARRIED OUT ON SAMPLES FROM AFFECTED AND OTHER ANIMALS

From affected herd	Age		Titre
		Agglut. against (575239)	
Animals affected at least two months :			
Lettie	2½ years		1:32
Rita	2 ,,		1:64
Glory II	2 ,,		1:64
Minnie	2 ,,		1:64
Stately	2 ,,		1:64
Bunnie	5 ,,		Trace
Sparkle	2½ ,,		1:128
535898	1½ ,,		1:64
462169	1½ ,,	Treated 1 month before sampling	1:32
575239	4 months	,, ,, ,, ,,	1:64
Fifi	4 ,,		1:256
Controls on farm :			
535907	1½ years		1:32
535906	9 months		1:32
XC5960	4 ,,		1:16
233388	4 ,,		1:16
Whisky	3 years		1:128
Swallow	2 ,,		1:32
Experimental Friesian calves at Langford before inoculation :			
107	6 ,,		1:32
109	6 ,,		1:16
111	6 ,,		Trace
112	6 ,,		1:16
113	4 ,,		1:16
114	4 ,,		1:4

The results (Table I) confirm those of other workers inasmuch as there seems to be no definite correlation between severity of lesions and titre of agglutination. It is interesting to note that animal 535898 which, in addition to extensive external lesions, also had internal lesions showed only a moderate titre of agglutination with the strain used and although, as a group, the infected animals showed higher titres, the difference between these and unaffected animals on the farm was very small. Even a comparison with young animals which were presumed not to have had the condition was not as marked as was expected.

Treatment

One of the cases (calf 575239) was given 5 daily intramuscular injections of chloramphenicol* (750 mg. per day) and by the twelfth day a significant improvement was noted which continued except for one abscess from which a biopsy sample had been taken. This responded to irrigation with Lugol's iodine. Three more cases were treated by intramuscular streptomycin, two for 9 days (5 grammes daily), and one yearling, 462169, for 5 days. This animal had in addition 1 ounce sodium iodide, administered intravenously immediately at the termination of antibiotic treatment. A second animal, Lettie, showed clinical signs of concurrent pyelonephritis and both conditions responded well over a period of 9 days.

The third animal, Glory II, which had extensive discharging skin lesions running from the right precrural node to the tuber coxae was also treated for 9 days and showed marked regression of the lesions and cessation of discharge by the end of that time.

With the exception of yearling 535898 which was later slaughtered (see below) the remaining animals were not treated in any way yet all showed a progressive improvement which became noticeably more rapid after the beginning of the growth of spring grass in mid-April. Ulcerated areas healed over, discharge ceased, nodules and lymph nodes diminished in size and gum lesions disappeared in the course of 3 to 4 months.

One animal (Glory II) which was successfully treated in April, however, showed a relatively rapid swelling of the ramus of the left mandible in July which was typical of a case of actinomycosis, although there was a history of possible trauma. In view of the fact that this condition can be caused by *A. lignieresi*, however, there seems some justification for assuming this case to be of this type. The lesion regressed to 75 per cent. of its maximum size in a period of 3 weeks and has not altered further despite the fact that no treatment has been administered 2 months later. This swelling does not appear to affect the cow in any way.

Post-mortem Examination

Yearling 535898

This animal had lost condition to a greater extent than the remainder and showed no tendency to improve. For this and other reasons it was shot and a full *post-mortem* examination carried out.

At this examination it was seen that the skin lesions were essentially superficial involving the dermis but in both shoulder and precrural areas the swelling was extensive, up to 15 cm. in length and 8 cm. wide with a depth of 4 to 5 cm. at the

* Chloromycetin Intramuscular. Parke Davis.

thickest part. The tissue was predominantly fibrous but contained scattered softer areas of granulation tissue with small or medium sized pus centres containing viscous creamy yellow pus.

The lesions on the right thigh consisted of nodules (2 cm. diam.) in the dermis with central pus.

The left prescapular lymph node was 15 cm. × 7 cm. × 6 cm. in size and consisted mainly of granulation tissue with numerous pus centres up to 1 cm. diameter. The left precrural lymph node (12 cm. × 7 cm. × 6 cm.) showed a similar structure.

A superficial lymph node was present but mainly replaced by granulomatous tissue in the buttock region, and the popliteal lymph node had been converted into an abscess from which 30 c.c. of pus exuded.

The right prescapular lymph node was normal, but even in the absence of skin lesions the right precrural showed small lesions of actinobacillosis in the cortex.

Apart from the nodes of the thoracic cavity other superficial and deep lymph nodes were normal.

None of the abdominal organs showed lesions and the alimentary tract was normal.

In the thoracic cavity the heart was normal but moderately extensive involvement of the right diaphragmatic lobe of the lung was seen together with small lesions in the right apical and left diaphragmatic lobes. The lesions took the form of extensive fibrosis with soft granulation tissue and pus centres scattered throughout.

The right apical lymph node was enlarged to 3 times normal size and showed early granulomatous lesions. The middle mediastinal lymph node was grossly enlarged, firm and fibrous externally and within a zone of granulomatous reaction showed a central cavity containing 40 to 50 c.c. of greenish yellow pus.

Discussion

This outbreak is of considerable interest because of the relatively high morbidity (app. 7 per cent.) in a very short period of time, and the high incidence of lesions of the skin and related lymph nodes rather than the tongue or alimentary tract.

Possible predisposing causes were considered and the following suggestions are made. In the first place it seems probable that the animals were in poorer condition than normal following the very dry summer of 1959.

Thomas (1931) reported on the difference in pathogenicity of *A. lignieresi* in sheep on a low plane of nutrition as compared with the effect of the organism on well fed sheep, in which established lesions showed rapid regression, and experimentally we have found it difficult to infect calves maintained at a good nutritive level even when large doses of organisms were used. Ristic, Herzberg, Sanders and Williams (1956) also had difficulty in reproducing the condition in 3 out of 5 experimental cattle, and the difficulty of establishing infection in healthy guinea-pigs and mice is well recognised, even where large doses are used.

Associated with the long period of very dry weather, a large batch of hay produced by the owner and fed to the animals just prior to and at the commencement of the period when lesions were seen, was extremely fibrous and stemmy. Whilst this is unlikely to have been responsible for the introduction of organisms through the skin over the thorax and abdomen, it may well have been associated with the production of mouth lesions, particularly by penetration around the incisor or premolar teeth, and may also have been sufficiently sharp to produce wounds of the skin of the face in younger calves. It is somewhat surprising, nevertheless, that no tongue lesions were produced.

The production of lesions of the flank and chest wall may well have been associated with skin damage produced by protruding bolt ends in an overcrowded pen, but no explanation could be found for lesions occurring in the skin over the parotid and submaxillary lymph nodes in the first calf heifers and the cow.

The improvement shown by such a large number of animals without treatment is also interesting though agreeing with the report of Thomas (*loc. cit.*) on sheep infected with *A. lignieresi* after experimental feeding of prickly pear. It is interesting to speculate on the possibility of recovery from lesions in the upper alimentary tract in the more commonly occurring manifestation of the disease.

Acknowledgments.—We are indebted to Mr. J. E. Phillips of the Department of Veterinary Bacteriology, University of Edinburgh, for suggestions regarding the agglutination test, to Mr. R. Harber and Mr. D. Hodgson for technical assistance and particularly to Mr. R. S. Undrill for photography.

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R.C.V.S. DAY

Members, their wives, families and friends will be welcome at all College functions in Edinburgh on Wednesday, June 7th: in St. Giles Cathedral in the morning, at the luncheon, and at the Annual General Meeting and tea in the afternoon at the Royal (Dick) School. Prior booking is requested in all cases. Full information may be obtained from the Registrar, Royal College of Veterinary Surgeons, College House, 29/31, Wright's Lane, Kensington, London, W.8, Telephone WEStern 2502.

Surface Disinfection of Poultry Buildings by Formaldehyde and Sulphur Dioxide

BY

E. G. HARRY

Houghton Poultry Research Station, Houghton, Huntingdon

SUMMARY.—(1) *Under appropriate conditions, effective disinfection of surfaces in poultry houses can be achieved either by generating formaldehyde from 2 fl. oz. formalin (B.P.) per 100 cu. ft., mixed with permanganate in the ratio 3:2; by dispersing 2 fl. oz. formalin per 300 cu. ft. as an aerosol and by heating 1.5 g. of paraformalaehyde per 100 cu. ft., or by generating sulphur dioxide by burning sulphur at a rate of 2 oz. per 100 cu. ft.*

(2) *Effective disinfection by the above is conditional on (a) good roof sealing in the case of formaldehyde produced from formalin and permanganate, (b) complete absence of ventilation in the case of formaldehyde produced by heating paraformaldehyde, (c) the spacing of generators 15 to 20 ft. apart or the operation of an aerosol generator from a number of sites, (d) the presence of a high moisture content in the treated surfaces in the case of sulphur dioxide.*

FORMALDEHYDE and sulphur dioxide, because of the ease with which they are initially dispersed and finally removed after the disinfection period, should provide a convenient means of disinfecting large buildings. The effectiveness of formaldehyde for disinfecting eggs and incubators has been well established by numerous investigations, but little information, however, is available of its efficiency when it is used on a larger scale to disinfect surfaces in poultry houses. The tests to be described were made to obtain further information on this aspect and also on the relative merits of the various methods of generating formaldehyde for fumigating purposes.

Sulphur dioxide is a fumigant which has fallen into disuse for public health purposes, mainly because of its corrosive action on certain fabrics and metals. This objection to its use does not apply, however, to the same extent in poultry houses and tests were made to determine its suitability as an alternative to formaldehyde.

Methods

Formaldehyde was generated as follows: (1) by mixing formalin (B.P.) with potassium permanganate in the ratio of 3:2, (2) by evaporation of a formalin aerosol dispersed by means of a Microsol "202" aerosol generator, and (3) by heating paraformaldehyde.

Sulphur dioxide was liberated by burning sulphur in the form of candles.

The tests were made in a brooder house and in 2 deep litter houses, of 800, 13,500 and 12,000 cu. ft. capacity respectively. The brooder house was so constructed that it was possible to render it comparatively air-tight, but in the deep litter houses some degree of ventilation occurred even when all doors, ventilators and windows were shut. No livestock was present in the test buildings and they had been cleaned out except for the 12,000 cu. ft. building which contained deep litter and had an atmospheric ammonia content, when shut, of 1.6 mg. NH_3 per cu. ft.

In the case of the brooder house a single generator centrally placed was used, but in the 13,500 cu. ft. building, generators were sited 15 to 20 ft. apart along the mid-line of the house. In the aerosol tests the generator was sited at one end of the building and was directed towards the opposite end.

Measurement of the degree of disinfection achieved in the various tests, was made by comparing the number of bacteria on test surfaces after exposure, with the number on control surfaces contaminated initially to the same extent and exposed for an identical period of time, to the atmosphere of untreated buildings having the same temperature and humidity as those containing the test surfaces.

Four types of contaminated surfaces were used for the test as follows: (1) Moist films. These were prepared by spreading 0.2 ml. of a 1 in 10,000 broth dilution of an overnight broth culture of the test organisms on 9 cm. Petri plates containing a 2 per cent. agar gel. These plates were inoculated 1 hour before use to allow excess moisture to be absorbed. (2) Dry films. These were prepared by spreading, on microscope slides, 0.3 ml. amounts of an overnight broth culture of the various test organisms mixed with an equal volume of a sterile 5 per cent. suspension of chicken faeces. These films were dried at 37° C. for 2 hours before use. (3) Chick fluff, which was spread in a thin layer over the surface of 9 cm. Petri lids. Before use the fluff was shaken with glass beads and passed through a fine sieve to render it of a sufficiently uniform composition for the purpose of the test. (4) Chicken faeces which had been dried *in vacuuo*, ground, mixed in a mortar and spread on Petri lids in the same way as the chick fluff.

In the case of surfaces (3) and (4) the activity of the fumigant was determined by the effect on the natural bacterial content of the test material. In the fluff, micrococci, enterococci and aerobic sporing bacilli were the principal types of bacteria present; *E. coli* and enterococci predominated in the faeces. Surfaces (1) and (2) were contaminated with either *Staphylococcus aureus, Salmonella pullorum, Escherichia coli* or *Streptococcus faecalis*.

In the 13,500 cu. ft. deep litter house, 18 moist and dry films of *E. coli* and *Str. faecalis* were distributed throughout the house for each test, in a regular

pattern, on the floor and at varying heights up to 7 ft. above floor level. In the tests in the 12,000 cu. ft., house, fluff and faeces were used as the test surfaces and these were distributed in 5 containers, one in each corner of the house and one in the middle, all at floor level. In the brooder house 5 moist films and 4 dry films of *Staph. aureus, E. coli* and *Salm. pullorum* were exposed for each test. These surfaces were distributed 3 ft. above ground level at points furthest from the site of the generator. Two of the moist surfaces were exposed in the vertical plane to determine whether any variation occurred in the action of the fumigant on surfaces in different planes.

The total exposure period of test and control surfaces was 24 hours, at the termination of which the buildings were ventilated and where appropriate, were treated with ammonia to remove residual formaldehyde (Harry, 1954).

The degree of disinfection obtained in each test was based on the following: In the case of surfaces (1) and (2), the surfaces were swabbed individually with sterile moist swabs which were transferred to 10 ml. of an appropriate selective medium. This medium was incubated at 37° C. for 48 hours, and growth was recorded at both 24 and 48 hours so that delay in growth could be detected. Delay in growth was indicative of a reduction in the number of survivors on test surfaces, as in all cases heavy growth of the test organism was obtained in 24 hours from the control surfaces. A preliminary test showed that the amount of formaldehyde likely to be transferred with the swabs from the test surfaces to the culture medium, was insufficient to influence the rate of growth of the test organisms.

All growths were transferred from fluid to solid medium for confirmation of the presence of the test organism. The selective media used were MacConkey broth for *E. coli*, selenite broth for *Salm. pullorum*, azide broth (Hannay & Norton, 1947) for *Str. faecalis* and nutrient broth (Oxo Limited), containing 6 per cent. NaCl, for *Staph. aureus*. In the case of surfaces (3) and (4), 3 replicate 15 mg. amounts from each of the test samples and from the control sample were shaken for 5 minutes with 10 ml. of broth in bottles containing glass beads. The containers were allowed to stand for 1 hour to enable large particles to sediment and the bacterial content of the supernatant was determined on nutrient agar plates by the method of Miles and Misra (1938).

No facilities were available for controlling the temperature or humidity of the buildings used for the tests, but it is not considered that the variations which did occur, as shown by recordings made at the beginning and end of each test, had any significant effect on the results obtained. The importance of atmospheric humidity on the disinfecting activity of fumigants on surfaces is the influence of this humidity on the moisture content of the surfaces exposed. The tests in this investigation were made using contaminated surfaces with both high and low moisture content and the moist surfaces can be assumed to represent surfaces at equilibrium with the atmospheric moisture content of buildings of high humidity, the opposite being the case with the dry films.

Results

The results shown in Table I indicate that a satisfactory degree of disinfection is obtained when formaldehyde is generated from formalin and permanganate when not less than 1 fl. oz. of formalin is used per 100 cu. ft. As shown in Table III (Test 2) this generation rate was also effective when applied to a deep litter house in disinfecting surfaces contaminated with *E. coli* and dry surfaces contaminated with *Str. faecalis*. In test No. 1 (Table III), however, in which the roof ventilators were left open, the test organism was recovered from all the surfaces positioned along the sides of the house farthest away from the generators. This showed that effective dispersion of formaldehyde vapour by this method can only be achieved when the roof vents are sealed. This would appear to be of particular importance when formaldehyde is generated from formalin and permanganate, as in this reaction the warm clouds of formaldehyde vapour which are produced, rise directly to the apex of the roof. If the roof is sealed the vapour spreads over the inside of the roof and in cooling sinks and spreads evenly over the lower surfaces of the house.

Formalin sprayed as an aerosol at a rate of 1 fl. oz. per 300 cu. ft., as shown in Table III, was found to have an effectiveness comparable to that obtained by the use of 1 fl. oz. formalin per 100 cu. ft. used in conjunction with permanganate. The tests on fluff and faeces, as shown in Table IV, also indicated

TABLE I

SURFACE DISINFECTION BY FORMALDEHYDE VAPOUR IN A 800 CU. FT. BROODER HOUSE. VAPOUR GENERATED FROM FORMALIN AND PERMANGANATE

Test number	Rate of formalin per 100 cu. ft. (fl. oz.)	Rate of HCHO per 100 cu. ft. (g.)	Number of surfaces showing presence of test organism (Max. 5 Moist 4 Dry)					
			Staph. aureus		*Salm. pullorum*		*E. coli*	
			Moist	Dry	Moist	Dry	Moist	Dry
1	2	12	0	3	0	0	0	0
2	2	12	0	0	0	0	0	0
3	2	12	0	2*(D)	0	0	0	0
4	1	6	0	1 (D)	0	–	2	0
5	1	6	0	1	0	–	2	0
6	0·5	3	1(D)	2	3	–	5	0

*D = Delayed growth.

that a formalin aerosol at this rate of generation is effective, although higher rates of application would be required to obtain a degree of disinfection with material such as fluff, comparable with that obtained on the other surfaces. In both tests shown in Table IV, a higher degree of disinfection was obtained in of the heat applied to the paraformaldehyde. In the tests shown in Table II, the heat source was an electric hot plate the distance of which, from the container holding the paraformaldehyde, was varied to produce evolution rates of from 10 to 20 g. formaldehyde per hour. It was found that with the

TABLE II
SURFACE DISINFECTION BY FORMALDEHYDE VAPOUR IN A 800 CU. FT. BROODER HOUSE. VAPOUR GENERATED FROM HEATED PARAFORMALDEHYDE.

Rate of $(HCHO)_n$ = HCHO per 100 cu. ft. (g.)	Rate of evolution g./hour	Ventilation present (+) or absent (−)	Number of surfaces showing presence of test organism (Max. 5 Moist 4 Dry)					
			Staph. aureus		*Salm. pullorum*		*E. coli*	
			Moist	Dry	Moist	Dry	Moist	Dry
5·0	15	−	0	2	−	−	4	1
7·5	15	−	0	1	−	−	1	0
7·5	20	−	1	1	1	−	2	1
5·0	20	+	1	3	1	−	3	0
5·0	10	+	1	4	5	−	5	2

TABLE III
SURFACE DISINFECTION BY FORMALDEHYDE VAPOUR IN A 13,500 CU. FT. DEEP LITTER HOUSE

Test number	Method of generation	Rate per 100 cu. ft.	Rate of HCHO per 100 cu. ft.	Number of surfaces showing presence of test organism (Max. 18 Moist 18 Dry)			
				E. coli		*Str. faecalis*	
				Moist	Dry	Moist	Dry
*1	Formalin/permang.	1 fl. oz.	6 g.	8	0	—	—
2	,, ...	,,	6 g.	1 (D)	0	15 (D)	2 (D)
3	Formalin aerosol	½ fl. oz.	4 g.	1	0	13 (D)	1 (D)
*4	Heated $(HCHO)_n$	3·3 g.	3·3 g.	13 (7D)	1(D)	18 (D)	13 (D)
*5	,, ...	6·0 g.	6·0 g.	18 (2D)	0	18 (3D)	13 (10D)

* Test 4. 7 generators vaporising 16g./hour. Test 5. 12 generators vaporising 16g./hour. Test 1. * Roof ventilators open.

sample 3 which was situated in the centre of the house and more in the projected path of the mist particles than the other samples. This showed that the degree of disinfection obtained by formalin dispersed as an aerosol, is influenced by the distance of the surface from the generator and its bearing relative to the path of the ejected particles. Although the atmosphere of the building used for these tests contained sufficient ammonia to render it unpleasant to breathe, the actual amount present as determined by analysis, was 1.6 mg. per cu. ft. which was theoretically insufficient to have a significant effect on the formaldehyde generated. This was confirmed by the results of the tests.

The tests made on the effectiveness of formaldehyde generated from paraformaldehyde, as shown in Table II, indicate that a satisfactory degree of disinfection was obtained when paraformaldehyde was heated in the proportion of 7.5 g. per 100 cu. ft. air space. At this level its effect was comparable with that obtained by the use of 1 fl. oz. formalin per 100 cu. ft. used in conjunction with permanganate. A feature of this method of generating formaldehyde, however, which has an important effect on its activity, was shown to be the rate of evolution of the formaldehyde which is dependent on the intensity

TABLE IV
THE DISINFECTING ACTIVITY OF FORMALIN WHEN DISPERSED AS AN AEROSOL IN A 12,000 CU. FT. DEEP LITTER HOUSE

Amount sprayed per 100 cu. ft.	Test material	Sample reference	Bacterial content × 10^6/g (Mean of 3 replicates)	Bacterial content × 10^6/g (Std. devn. of mean)	Degree of disinfection per cent.
		Control	33·6	0·5	
		Test 1	12·3	1·1	64·5
		,, 2	4·3	0·3	89·1
		,, 3	0·03	—	>99·9
⅜ fl. oz.	Chick	,, 4	19·7	5·0	45·4
	fluff	,, 5	13·6	3·8	63·6
		Control	14·7	3·8	
		Test 1	8·7	3·7	40·8
	Chick	,, 2	7·7	4·0	47·6
	fluff	,, 3	3·7	1·4	79·6
½ fl. oz.		,, 4	8·3	2·4	43·5
		,, 5	8·3	3·4	43·5
		Control	8·1	1·1	
½ fl. oz.	Chicken	Test 1			
	faeces	,, 2			
		,, 3	<0·02	—	>99·9
		,, 4			
		,, 5			

room well sealed, an evolution rate of 15 g. per hour was apparently slightly more effective than a rate of 20 g. per hour when equal amounts of formaldehyde were evolved. In the case of the tests in which some ventilation was allowed to occur, however, a low rate of evolution was found to be considerably less effective than one in which twice the rate of evolution was used. The paraformaldehyde used in the tests in the deep litter house as shown in Table III, was vaporised by 7 to 12 lamp generators with a mean output of 16 g. HCHO per hour and a satisfactory degree of disinfection was not achieved, although the total amount of formaldehyde generated in one test was equivalent to that obtained from 1 fl. oz. formalin per 100 cu. ft. used in conjunction with permanganate. The deep litter house used, allowed some ventilation even when completely closed. Air circulation was particularly marked at floor level and it was from surfaces exposed in this position that the highest proportion of recoveries of test organisms were obtained.

The tests with sulphur, as indicated in Table V, showed that a satisfactory degree of disinfection could be obtained, on moist surfaces, by burning sulphur at a rate of 2 oz. per 100 cu. ft., to produce a theoretical SO_2 concentration of 120 g. per 100 cu. ft. This, when compared with the concentration of formaldehyde required to produce an equivalent effect (6 g. per 100 cu. ft.), demonstrates the much lower bactericidal activity of sulphur dioxide. The tests also showed that sulphur dioxide has little activity on dry surfaces. It was found that when generated from sulphur candles, sulphur dioxide was produced at a rate of 1,300 g. per hour per candle, which making allowance for the lower activity of this gas relative to formaldehyde, should constitute a rate of generation sufficient to overcome the losses likely to occur from imperfect sealing of the fumigated building.

Recordings of temperature and humidity, taken during the autumn months in which the tests were made, showed that the temperature and humidity means for the test periods were unlikely to have varied widely and there was no evidence provided by replicate tests, that the variations noted had any significant effect on the results obtained. Recordings taken at the beginning and end of the test periods gave a mean temperature of 59.5° F. with a range of 57° to 65° F. The mean relative humidity was 70.8 per cent. ranging from 59 to 88 per cent.

In none of the tests made in the brooder house was any evidence obtained, that the degree of disinfection of the test surfaces was influenced by their position in either the horizontal or vertical plane.

Discussion

The tests showed that formaldehyde, generated by each of the 3 methods investigated, and sulphur dioxide, can be used effectively for disinfecting surfaces in large buildings conditional on the use of adequate amounts and the non-existence of neutralising factors.

In the case of formaldehyde a satisfactory degree of disinfection required an application rate of not less than 6 g. HCHO per 100 cu. ft., allowance being made in the case of dispersal as an aerosol, for the water content of the formalin and in the case of generation from formalin and permanganate, of the loss of approximately half of the formalin by chemical reaction. Sulphur dioxide was found to be active when applied at a rate of not less than 120 g. SO_2 per 100 cu. ft.

TABLE V
SURFACE DISINFECTION BY SULPHUR DIOXIDE IN A 800 CU. FT. BROODER HOUSE. GAS GENERATED BY BURNING SULPHUR

Test number	Rate of S per 100 cu. ft. ozs.	Rate of SO_2 per 100 cu. ft. (g.)	Number of surface showing presence of test organism (Max. 5 Moist 4 Dry)					
			Staph. aureus		*Salm. pullorum*		*E. coli*	
			Moist	Dry	Moist	Dry	Moist	Dry
1	2	120	0	3	0	–	0	4
2	2	120	0	2	0	–	0	2
3	1	60	2	4	0	–	0	4
4	1	60	1	4	0	0	0	4

The tests showed that the effectiveness of the various methods of generating formaldehyde were influenced greatly by the degree to which the fumigated buildings could be sealed. When roof ventilators cannot be sealed, where ridge ventilation is used, or where the roof crest does not fit tightly to the roof, the tests showed that loss of formaldehyde will be excessive when this is produced in the form of warm vapours, as in the case of generation from formalin and permanganate. In buildings with badly fitting doors and windows, or with numerous small ventilators difficult to seal and probably in buildings with litter present of a high ammonia content, the rate at which the effective concentration of formaldehyde is reduced by diffusion and neutralisation, may be sufficient to render ineffective methods of generation in which it is produced at a slow rate, as by the application of gentle heat to paraformaldehyde or formalin.

A satisfactory distribution of formaldehyde vapour was obtained in the deep litter house tests, when generators were spaced 15 to 20 feet apart along the length of the building. In the case of dispersal as an aerosol, unevenness of distribution of the vapour was demonstrated when the aerosol generator was operated from a fixed point, so that some arrangement for movement of the generator appears to be

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Surface Disinfection of Poultry Buildings.—*Concluded.*

advisable when this method of dispersal is used in a large house. Difficulty in obtaining even distribution of the aerosol in the case of formalin, probably resulted to some extent from the absence of a non-volatile component in the aerosol particles. Aerosol sized particles of formalin evaporate quickly after leaving the generator and thus rapidly lose their momentum.

The rate of formalin required in the test buildings was less than that found necessary for the fumigation of incubators (Lancaster, Gordon & Harry, 1954) and this was probably the result of the proportional decrease in surface area associated with increase in cubic capacity.

The tests with sulphur dioxide, showed that its effectiveness was restricted to moist infected surfaces, so that its use in practice, as an alternative to formaldehyde, is justified only if the surfaces to be treated are moist, or if their moisture content has been allowed to reach equilibrium with that of an atmosphere of high humidity.

Of the test organisms used, *Str. faecalis* was the most resistant to disinfection and enterococci were also the only organisms which survived fumigation in the faeces samples. Failure to achieve a higher degree of disinfection of fluff probably resulted from the inability of formaldehyde to penetrate into materials of this nature as demonstrated by Nordgren (1939), and this limitation of its use should be recognised when fluff and similar materials require disinfection.

Acknowledgments.—The experimental work was carried out with the technical assistance of Mr. E. Carrington.

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The Future of the Profession in Britain*

In choosing this subject—the future of the profession—as the theme for this Presidential address I am following in the footsteps of my distinguished colleague, Professor J. G. Wright who delivered a most fascinating talk on the subject to the Annual Conference of the Association of Veterinary Students a few weeks ago at their meeting in the Town Hall at Wallasey. This was published in THE VETERINARY RECORD of March 11th. What I shall say will inevitably overlap with what he said, but in any case the problem of the future of our profession is important enough to justify some repetition, and my suggestions are not the same as those of Professor Wright.

Practitioners in general have never been busier; nor have the newly qualified graduates ever found it easier to obtain posts; long before they qualify there are practitioners angling for their services, and at salaries which make it very difficult for us in the Schools to attract more than a very few of them into research and teaching posts.

Some 230 names are added to the Register each year, which means a net increase of 140, allowing for deaths, and retirements. In 1935 there were 3,500 veterinary surgeons; in 1965, four years from now, there will be 7,000. The profession has thus doubled its numbers in 30 years, the increase being much greater since 1945 than in the preceding 10 years. Within the next 10 years about 1,000 more veterinary surgeons will probably have entered farm practice; the other 400 will be absorbed into small-animal practice and a wide variety of salaried posts in the Animal Health Division, the veterinary Schools, research institutes, and industry. How can we ensure that the new entrants to our profession are able to do two things—firstly, to make their greatest possible contribution to animal health, and secondly, to practise their profession in a way that gives them both mental satisfaction and a fair monetary reward?

I propose to talk first about the veterinary surgeon in private practice. So far as small-animal practice is concerned, it seems to me that owners of pets have never been so well served as now. Advances in medicine, surgery, anaesthesia and immunisation have been incorporated into practice, so that the veterinary surgeon can give his clients all the skill and care that their animals require. It ought to be possible soon to do away with the system of licensees, so that all who treat small animals are veterinary practitioners. I cannot see much more expansion in numbers being needed in small-animal practice, although it is clear that practitioners have to widen their interests to deal with the great increase in the small pets that have replaced dogs in many homes. The issue of technical publications dealing with the health and diseases of cage birds and the extension of research in this field are welcome moves. The older ones among us remember the times when first Henry Gray and then Tom Hare were almost the only people in our profession who paid any attention to these creatures.

Large-animal Practice

I turn now to farm animal practice. The relationship that has grown up between the Animal Health Division and the private practitioner who operates as a Local Veterinary Inspector has become a very fruitful one. In eradicating bovine tuberculosis last year within a much shorter time than had been thought possible—the Diseases of Animals Act, 1950, provided for Treasury grants for 25 years, whereas 10 years has brought virtual eradication into being—the profession has achieved a great success. The

* Professor E. G. White's Presidential Address to the Lancashire Veterinary Association, March 1st, 1961.

activities of the LVI in connexion with notifiable diseases, the Milk and Dairies Regulations, licensing of breeding stock and other State measures for improving animal health have also been fruitful. What of the future? Are there not new fields in which the private practitioner, acting as L.V.I., and the whole-time State veterinarians, can co-operate together in improving animal health and controlling disease? Tuberculin testing was a very necessary technique, and will for very many years still be needed, even if on a reduced scale, but it is not a very satisfying occupation for more than a very small part of the activities of a veterinary surgeon who has spent 5 or 6 years in a university, training to become a member of a profession. It should not take up too long a proportion of any veterinarian's time, even though the financial returns it provides may be substantial. In the same category are techniques such as taking blood or milk samples for bacteriological or serological tests. This kind of work is relatively unrewarding for a professional man, save financially; it is less involved than many of the procedures which the laboratory technician carries out with only a fraction of the scientific training of a veterinary surgeon. It would be a mistake to allow too much of the time of the profession to be taken up by such techniques, at the expense of work making more demands on their skill and intelligence. In the Soviet Union there are 42,000 veterinary surgeons and 50,000 lay assistants; in many overseas territories, trained lay assistants do most of the routine technical procedures; in the field of A.I. lay inseminators do the routine work of insemination. So long as such persons are under the strict control of veterinary surgeons in all they do, they are of great value in sparing the profession for more valuable tasks. It may perhaps be possible to develop a scheme whereby such lay assistants can be more widely used if the methods used to control disease in the future necessitate an extensive use of simple technical procedures. The plate test for B.W.D. is an example: lay assistants are permitted to carry it out by virtue of an Order made under the Veterinary Surgeons Act of 1948.

Meat Inspection

To turn for a moment to meat inspection, it is astonishing that in any country the wealth of pathological material which comes into abattoirs should be almost entirely unused by the veterinary profession! Here in abattoirs, and even more so in knackeries, lies the picture of disease incidence in local areas which veterinarians ought to be aware of if they are to set about controlling it. It should not be necessary to make a survey of particular diseases in an abattoir or knackery to provide us with the data we need—such collection and analysis of data ought to be going on, at least in all *large* knackeries and abattoirs, all the time. It is as if the Registrar General had to prepare his annual statistics without having access to *post mortem* records or death statistics, because these were the property of the *post mortem* room technicians! I do hope our interest and concern in meat hygiene can be extended. This must inevitably come through the State and might well begin with establishing investigation centres in a few large abattoirs and knackeries where material would be collected and studied by veterinary surgeons. This does not mean veterinarians spending all day at routine meat inspection; it means rather than they should be present to guide in the interpretation of disease conditions and to investigate their nature. There is an opportunity here to use at least a dozen veterinary surgeons in this kind of work within the next 10 years in England and Wales if facilities can be provided.

I come back now to the private practitioner in farm practice. It seems to me that he is very often frustrated because he is unable to spend as much time as he would wish in advising his clients on how to control and prevent disease, simply because he cannot obtain from such advice a fee that will enable him to make a living. It is sad indeed that a few hours spent tuberculin testing should be more rewarding financially than such skilled procedures as investigating an infertility problem in cattle, advising on the control of virus pneumonia in pigs, making routine regular visits to obtain effective control of mastitis, or spending time on a farm making a detailed study of the conditions of feeding and management which might help to control parasitism, acetonaemia, hypomagnesaemia, calf scours, or chronic respiratory disease of poultry. There ought to be ample opportunity for the practitioner to do any of these things, provided he has acquired the necessary skill and is interested in this kind of work. The old Survey Scheme, associated with the name of Steele-Bodger, was based on this idea of bringing the veterinary surgeon repeatedly on to the farm to get to grips with a few of the important diseases that cause economic loss.

The Veterinary Surgeon as Adviser

How can the practitioner be financed to do this work? One answer is that the farmer should be prepared to pay for advice, just as he is prepared to pay for operations, vaccines or antibiotics. To some extent this is possible, but I doubt whether most practitioners could make a living by the fees they would receive for giving advice. To quote from conditions in another country: in East Germany there is a statutory list of fees for all veterinary work—some 130 items or so. It includes fees not only for specific services such as a wide variety of operations on large and small animals, but also for routine visits to farms to inspect the stock and advise on general health problems and for routine examination of herds for infertility, pregnancy diagnosis, and even for advice given in writing or by telephone! In countries where distances from farms to veterinary surgeons are much greater than here, the monthly visit of the veterinarian is also used mainly for such routine inspections and for giving advice; the farmer has to deal with the individual cases of diseases himself in the interval because he could not afford to pay for a visit to deal with disease in a single animal.

In this country the farmer can obtain advice without a fee on almost every aspect of farming—except

animal health. The very large N.A.A.S. organisation exists for this purpose. Whether it be soil *p*H, parasites of his crops, use of fertilisers, or low S.N.F. in his milk he can call on the services of N.A.A.S. staff at any time. Ought not animal disease to be included in the scheme? The Poultry Advisory Officer already exists to give advice about poultry husbandry but is instructed not to give advice on disease. Why not encourage the private practitioner to take an interest in poultry disease by taking a special course in this work, like those which this Division and the Ministry are arranging, and then make the giving of advice possible by paying the veterinary surgeon to provide it?

My suggestion is, in fact, to extend the functions of the L.V.I. so that he can be used locally for advisory work of specified kinds on farms. The D.V.O. would need to be satisfied that the L.V.I. was qualified to do this work; he has already to be assured of this with other duties before appointing a practitioner to be an L.V.I. Payment for such advice would then be based on mileage, together with a fee based on the flock or herd size. Such an arrangement would continue the association between private practitioners and the Animal Health Division and extend its scope. Some of the money spent on tuberculin testing would be used in future years to pay for advice on preventive medicine on the farm.

Some may advance the argument that the practitioner cannot do this work because he is not qualified to do it nor interested sufficiently in it. I just do not accept this argument. I believe practitioners are anxious to spend more of their time advising on disease prevention if they can make a living in that way. Preventing disease in the flock or herd is much more important nowadays than curing disease in the individual animal. Who is qualified to do this work but the veterinary surgeon? This is largely what he is trained to do, but all too often he cannot practise it. In my view a great contribution could be made to preventive medicine on the farm if practitioners could be engaged more widely in advising on disease control and financed from State funds, administered through the Animal Health Division.

As to training for this work, the veterinary course in the Schools has been developed in recent years in this direction and refresher courses covering several different fields could be organised in which Schools and Ministry co-operate. The poultry course this Division is running later this year is just such a course—it is to be run by the V.I.O. school staff, and an expert from the Central Ministry Laboratory. Incidentally, as a teacher whose work includes explaining to students how State veterinary medicine works in this conntry, I feel it would be of great value if our students spent a week or two at some time with a full-time veterinary officer in the field and at the office seeing how the Animal Health Dvision work is carried out. When seeing practice with a private practitioner, the student already sees the L.V.I. at work. Those students who have been fortunate enough to have contact with a full-time V.O. have gained much from the association. I do not know if this plan could be carried out without imposing too great a burden on the A.H.D. staff.

Quite apart from this suggested development, it may well be possible for practitioners to get together and establish their own veterinary hospitals. There may also be a case for a state veterinary service for farm animals on a regional basis such as Professor Wright has outlined. My plea is for all these matters to receive urgent consideration by the profession so that we can see that the great increase in our numbers is used to the best advantage of the health of animals and the prosperity of agriculture. The plan should come from the profession, and not be imposed on it by the State. Let us decide what we want and demand it with a united voice, whether it relates to meat hygiene, preventive medicine on the farm, or regional veterinary hospitals within a State farm livestock service.

There remain two further points about the future. Firstly, I am glad the profession is entering into closer co-operation with the medical profession concerning diseases of animals that may cause ill health in man. Joint conferences on salmonellosis and brucellosis are very welcome signs of this.

Research in the Schools

Secondly, a word about research. It would be a tragedy if expansion of research in the veterinary Schools lagged behind what is happening in Ministry laboratories, research institutes under the control of the A.R.C., and the numerous research units that industry is setting up. The veterinary Schools need more funds for buildings, staff and equipment so that they can offer good opportunities for veterinary surgeons and non-veterinary scientists to work together in all fields of animal health. With general practice offering such large salaries to the new graduate we must be able to offer a reasonable grant to the young man or woman who is eager to devote time to research and teaching in the veterinary Schools. Especially is the need urgent in research associated with the clinical departments. Alongside the people with specially developed clinical skills in diagnosis and treatment of surgical and medical disorders of the individual animal we must collect groups of people trained in such fields as biochemistry, physiology, parasitology and pharmacology who will advance the frontiers of knowledge in relation to animal disease. The science specialist and the man with special clinical skill will be of mutual benefit to one another—neither alone is sufficient. In the past there has tended to be a gulf between the two—clinical departments tended to be solely occupied by clinicians, which was quite natural in the old days; to-day there should be departments where the art of clinical diagnosis and the science of investigation into pathogenesis and aetiology are carried out side by side. As an example, any research carried out on hypomagnesaemia or acetonaemia needs the participation of the skilled biochemist if we are ever to discover just how these diseases come about and not merely be content with diagnosing and treating them.

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Current Literature

BOOK REVIEWS

An Introduction to Embryology. By B. I. BALINSKY. W. B. Saunders, London. (1960). 54s.

In the introduction to this book the author explains that the first draft was written in 1952 and that duplicated copies of this draft were used by his students during subsequent years, so that he has had the opportunity of eliminating defects of presentation. The book sets out to weld purely descriptive embryology with experimental embryology in a comprehensive way. It includes subjects such as post-embryonic development, regeneration, metamorphosis, and asexual reproduction, in more than a cursory manner ; in addition attention is given to the question of the genetic control of development.

The book is divided into 6 major sections. The first defines the development of the subject and gives an outline of the problems that excited controversy in the past ; it also gives a very useful classification of the subject as a whole and of the terminology. The second and third parts are largely descriptive and deal with the origin and development of the egg, and with gastrulation and the rudimentary formation of primary organs. The fourth part deals with organogenesis, the fifth with differentiation and growth, and the sixth with morphogenetic processes in the later part of ontogenesis. The experimental side of the subject receives greater emphasis as the book proceeds and most of the experimental data quoted is aimed at explaining how development and growth occurs as it does. The subject is essentially one that is based on the study of the development of invertebrates, tadpoles and other accessible amphibia, insects, or on hen's eggs. The subject of the physiology of the mammalian foetus is not discussed as such ; it would perhaps have been a mistake to have attempted it as it is a subject in itself.

The great virtue of this book is that it presents the subject of embryology as one which is intensely interesting, and this is largely due to the experimental approach that is incorporated.

Studies of Vertebrate Neurogenesis. By S. RAMON Y CAJAL. Blackwell Scientific Publications, Oxford (1960). 106s.

This volume consists of translations of original papers by Cajal on the histogenesis of the nervous system ; it is the first time that a full account of this work has been available in English.

The origin of the neurone and axon are considered in the first part, with a discussion on peripheral nerve regeneration. Sensory (including special sense) and motor terminations are then described with a chapter on the motor endings in the tongue. The third part contains an account of the histogenesis of the spinal cord. There are then chapters on the cerebellum and cerebrum, and the final part is devoted to the retina.

It is interesting to see how many of Cajal's histological observations have been confirmed by recent tissue culture and ciné-microscopical techniques. The book is well illustrated and produced but the account is difficult to read because of the amount of space devoted to polemics. It is therefore hardly suitable for casual reading, but is a useful reference for those engaged in embryology and morphology of the nervous system.

An Introduction to Animal Biology. By D. C. BRAUNGART & RITA BUDDEKE. C. V. Mosby, St. Louis (1960) and Henry Kimpton, London (1960). 47s.

Fortunate is the teacher who can plan his own syllabus, and more so he or she whose work is covered step by step by a textbook. Does the egg come first or the hen? Does the lecturer come first or the textbook ? There may be some doubt about the priority

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The Future of the Profession in Britain.—*Concluded.*

Conclusion

I am not expecting you to agree with all I have said, or perhaps even with any of it. What I hope for is that our services to animal health will be looked at to ensure that we use our resources to best advantage. If we are to go on turning out 140 extra veterinary surgeons every year we owe them and the nation a duty to see they are usefully employed. If veterinary services are already adequately carried out and no expansion is needed, let us reduce the entries to our schools as soon as the supply has caught up with the demand. We must not just invent work for surplus veterinarians if a surplus should occur. I do not think we have yet provided an entirely satisfactory service and I think we should give a lot of thought as to how this should be done before the numbers in the profession get much larger. In thinking of our own needs, we must not forget other countries less fortunate than ourselves so far as veterinarians are concerned. In the whole of East and West Africa, for example, there is as yet not a single veterinary School turning out graduates, which means that for many years these countries, already independent or fast achieving independence, will look to other countries for veterinarians, partly their own men trained abroad and partly expatriates. If we cannot help them they will have to go elsewhere for help. Although the Colonial Veterinary Service may have few vacancies to-day there are many countries that would welcome British veterinarians to help them for a few years until they can train their own profession. To-day's British graduates are much better equipped for this work than were the graduates of 20 years ago because they are now better trained in preventive medicine and are not so exclusively concerned with the treatment of the individual sick animal.

If this short talk has provided one or two ideas for the future of our expanding profession it will have served a useful purpose.

of the hen, but not about the lecturer, and in the field of biology there is a plethora of the latter, each one of whom has his own way of going about the matter and who writes a textbook according to his liking, establishing each time a variant of the standard theme.

With the exception of anatomy, which of course the subject embraces, there is perhaps no other subject which so urgently demands a high standard of illustration. In this respect this book falls short ; whilst the general standard is high there are some reproductions which should never have appeared, such as figure 101—obviously taken from an older textbook relating to the sting of the honey bee. There are other examples where one would have expected modernisation. Further, the method of presentation on occasion appears to lag behind modern conception, as in figure 78 where the deeply worn path of presenting each appendage of the cray fish separately is followed, rather than the more enlightening method of correlating each with its specific function, thus bringing the whole thing to life.

In a field where there is so much attractive material from which to draw, an author must have not only great powers of discernment but courage to eliminate. In this edition the arrangement of the material is, however, attractive ; we see a logical progression from protoplasm to protozoa, perifera (sponges) to heredity and genetics. The blend of reality with morbid specimens whose intimacies are unravelled in the classroom makes the book perhaps more readable and perhaps more applicable to the intermediate student, sixth form senior school pupil, or technical college student, than the post graduate or honours student. Apart from the references collected at the end of the book, there are some excellent appendices covering the classification of the chief groups of animal and genetic problems, and a very extensive glossary.

Mackie & McCartney's Handbook of Bacteriology—A Guide to the Laboratory Diagnosis and Control of Infection. Edited by R. CRUICKSHANK. E. & S. Livingstone, Edinburgh. (10th Edition, 1960). 40s.

Since the appearance in 1953 of the 9th edition of this classic bacteriological textbook Professor Mackie has died and Dr. McCartney has retired. Professor Robert Cruickshank, aided by his colleagues in the Bacteriology Department of Edinburgh University, has undertaken to continue the production of this work which has become an almost indispensable tool in most British bacteriological laboratories. Apart from the extensive additions and alterations necessary to bring the book up to date there are certain changes in emphasis which should be noted. The title is now " Handbook of Bacteriology—A guide to the Laboratory Diagnosis and Control of Infection," in contrast to the earlier editions which were called " Handbook of Practical Bacteriology—A guide to Bacteriological Laboratory Work." This change must not be taken to mean that the primary value of the work as essentially a compendium of technical methods has been lost, but there has been an expansion of Part I, dealing with Microbial Biology : Infection and Immunity, and of Part III, Pathogenic and Commensal Micro-organisms.

Broadly speaking, the book retains its original outstanding value as a technical handbook and one was unable to detect the omission of any diagnostic procedure currently in widespread use in bacteriological and virological laboratories. There is an increase in the number of chapters on viruses from 1 to 8, and the descriptions of virological techniques in Chapter XVIII are particularly welcome. On the other hand, Chapter XLV on Protozoa is unsatisfying, for certainly the description of trypanosomiasis is quite inadequate either as an account of the disease or as an aid to differential diagnosis of the various species. The authors appear to be aware of this for they recommend the consultation of " one of the larger works on bacteriology or protozoology."

One has the feeling that the book attempts too much, for although it is difficult to put one's finger on errors or undue simplification, the discussions on Infection and Resistance to Infection, and on Acquired Immunity, in particular leave one with a sense of a story half told. This is true of some of the accounts of specific infections, including some of their veterinary aspects which, according to the preface, are included for veterinary graduates and undergraduates. For instance, the blood agglutination test for *Br. abortus* infection in cattle is dismissed in 5 lines, and a later mention of S.19 vaccination makes no mention of its effect on blood agglutinin titres.

Bacteriology, which includes virology in this context, has become such an enormous subject that it is doubtful if any 1 book can do the subject justice if it attempts a description of the theoretical and scientific principles of the microbial diseases caused in man and animals, and of the laboratory techniques needed for their diagnosis and study. Nevertheless, " Mackie and McCartney " retains, in this edition, its pre-eminence as a splendid technical handbook which will continue to occupy a place close to the laboratory bench of many working microbiologists.

Cobalt in Animal Feeding. By R. G. FULLER and V. W. MCALPHINE. Centre d'Information du Cobalt. Brussels. (1961). pp. 23.

This booklet describes simply and concisely (a) the nature and effects of cobalt deficiency in sheep and cattle, (b) the known and suspected areas where it occurs throughout the world and, (c) various methods of prevention and control.

The few selected references provided are to works by experts in this subject. The contents are well set out and illustrated and provide a very useful up-to-date account of the problem.

It may be obtained free of charge by application to Centre d'Information du Cobalt, Rue des Colonies, 35 Brussels, Belgium.

DISCIPLINARY ACTION BY THE KENNEL CLUB

From a Correspondent

I have been asked to write an account of the case brought against Mr. F. Sills by the Kennel Club under Rule 17 of their regulations. The proceedings are of considerable interest and are worth reporting as fully as possible, subject to certain reservations imposed by the fact that disciplinary charges are heard before the Committee on the Club's private premises, and the Press is excluded, as is usual under these circumstances.

On August 29th, 1959, a show was held at Liddesdale under Kennel Club Licence Show Regulations, with a single veterinary surgeon in attendance. Mr. Sills presented for examination a Lakeland Terrier under the name of "Lakelynn Legal," the property of a Mrs. Gaskell, for whom he was keeping and handling the dog.

The veterinary surgeon detected an abnormality in the dog's right testicle, and on closer examination concluded that the testicle was false. For this reason he rejected the dog and it was taken away by Mr. Sills. This was subsequently reported to the show secretary and in due course the case came before the General Committee of the Kennel Club and was heard under Rule 17.

At the hearing Mr. Sills brought with him a Lakeland Terrier that he declared was "Lakelynn Legal," the dog he had presented at Liddesdale. It was subjected to veterinary examination and was pronounced to be an entire.

The veterinary surgeon who had been on duty at the show denied that the animal now produced was the same he had rejected. The rejected animal had an abnormal testicle, to which he had applied extreme pressure during his examination, whereas the dog now produced had 2 perfectly normal testicles.

After a prolonged hearing the Committee found Mr. Sills guilty and suspended him under the provisions of Kennel Club rule 17, for a period of 5 years.

From this verdict there was no appeal in the recognised sense of the term, but Mr. Sills lodged an objection in law against the proceedings of the Committee. The Kennel Club appoints a Disciplinary sub-committee, whose duty it is to investigate complaints alleging breaches of rules and regulations, and to decide whether there is a *prima facie* case to be answered before the General Committee. Under Kennel Club rules, no member of this sub-committee is permitted to take any part in a subsequent hearing; but owing to the interest created by this case, some members were in the room while the case was being heard although they took no part in the proceedings.

It was, therefore, agreed that the original hearing was void because these sub-committee members had been in the room, and it was decided that there should be a new hearing by members of the General Committee who had not been present at the original hearing. There are some 30 people entitled to sit on the General Committee and there would have been no difficulty in obtaining a quorum for this new hearing.

Mr. Sills's advisers, however, put forward a suggestion that the new hearing should be before an entirely independent person, or persons, rather in the form of an arbitration. It was eventually agreed by both sides that the hearing should take place before Mr. Malcolm Morris, Q.C. Under the Kennel Club rules it was necessary to obtain the consent of a special general meeting to delegate authority, and this was duly granted.

The hearing took place before Mr. Malcolm Morris, Q.C. on March 3rd, 1961, at the Kennel Club. For reasons already stated, I cannot give a verbatim report of the expert evidence given for the prosecution and for the defence, but it may be summarised as as follows:—

For the defence, it was contended that the veterinary surgeon at Liddesdale should have made a longer and more detailed examination before diagnosing a false testicle. Apparently no attempt had been made to find the testicular cord, the absence of which would have gone far to prove that the testicle was artificial. The possibility of a fibrosed testicle was put forward, but on cross-examination it was admitted that this would "give" under, and be sensitive to, pressure.

For the prosecution, evidence was given of an experimental operation performed on a dog that had been destroyed. One testicle had been removed, and after closing the incision warm wax had been injected into the scrotum from a syringe. This was easily shaped, and set quite hard. It may be observed here that if a liquid is used, with the intention that it should set, this can be done with a syringe; but if a pre-made plastic testicle were inserted this would require an incision which, in a young animal, would heal well and be very difficult to detect.

The defence suggested that the examination made by the veterinary surgeon at Liddesdale was too cursory to justify the diagnosis of a false testicle, but this was combated by evidence brought by the prosecution.

At the conclusion of the hearing, Mr. Morris found the case against Mr. Sills to have been proved, and gave judgment as follows:—

"On January 16th, 1961, I was asked by the abovementioned parties" (the secretary of the Kennel Club and Mr. F. Sills) "to hear and determine a complaint under rule 17 of the Kennel Club rules against Mr. F. Sills as follows:—

'That on August 29th, 1959, by having in his charge and handled the Lakeland Terrier Exhibit No. 75, Lakelynn Legal, at the Liddesdale Show (being a show held under the Kennel Club Licence Show Regulations), when he knew or should have known that an artificial testicle was present in the right scrotal sac of the said terrier he committed a breach of Kennel Club regulations for the Preparation of Dogs for Exhibition, and was guilty of discreditable conduct under Rule 17 of the Kennel Club rules.'

(*Concluded at foot of col. 1 overleaf*)

Divisional News

THE R.A.V.C. DIVISION

A meeting was held at the R.A.V.C. School & Stores, Aldershot, on March 15th, 1961. Brigadier J. Clabby, O.B.E., was in the chair. Eighteen members were present, and 8 guests later joined in the day's proceedings, apologies for absence being received from 5 members.

Minutes

The minutes of the previous meeting held on October 5th, 1960, having been published in the R.A.V.C. Journal, were taken as read and signed.

Next Meeting

Major Davenport proposed that the next meeting should be combined with "a day in the country" in the New Forest, and offered to make the necessary arrangements. The proposal was seconded by Major Bishop and carried unanimously.

Major Davenport explained that he could arrange for the Division to visit several stud farms, where some of the best types of horses and ponies in the country could be seen, and at least 1 block of modern stable buildings, which he considered left little to be desired in construction and layout.

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Following the meeting, members were welcomed to the R.A.V.C. School by Major Bishop who outlined the programme he had arranged for the day; they then had an opportunity of viewing a large number of paintings and sketches by Major W. P. Moss, M.C., T.D. Brigadier Clabby announced that Major Moss had very kindly presented 4 of the paintings to the R.A.V.C. Headquarters Mess.

After coffee Major Bishop opened a discussion on corticosteroids in the treatment of articular conditions. He pointed out that while it was well known that intra-articular injections are often of value in the horse, information with regard to the dog was scanty—therefore a trial was in progress to assess the value in that species. The treatment of arthritis of the hip joint in the 5- to 9-year-old guard dog appeared to be most promising. The clinical picture was reviewed, radiographs shown to demonstrate the lesions, and *post mortem* specimens exhibited.

Major Bishop then demonstrated the technique for the intra-articular injection of 20 mg. hydrocortisone acetate on a 6-year-old Alsatian under Thiopentone and oxygen/nitrous oxide/ether anaesthesia.

Members then visited the animal house and stables where several interesting cases were seen and discussed. Then followed a tour of the R.A.V.C. Stores and, later, the refurbished museum. This proved to be of particular interest to many members and the curator was complimented on the decoration, layout of specimens, and exhibits. It is considered that past and present members of the R.A.V.C. and, indeed, the profession in general, would find a visit to this museum of considerable interest and well worth while.

The meeting reassembled in the School after luncheon at 2.30 p.m., when Major Bishop introduced the heart beat detector. In co-operation with the Clothing and Equipment Physiological Research Establishment (Dr. Rambourne), the heart beat detector was demonstrated on a normal horse. The detector utilises 3 electrodes, placed on the animal in a like manner to electro-cardiography electrodes; the heart rate is turned into a radio signal and picked up on a receiver. The apparatus carried by the horse weighs under 2 lb. Trial work is proceeding with a view to establishing the optimal points for the electrodes. The next stage will be to examine heart rates under conditions of stress and disease. The prime advantage of the apparatus is that the rate of the heart can be examined whilst the horse is being exercised—even galloped. The demonstration was concluded by listening to a tape recording of the heart rate of various laboratory animals under slight conditions of stress.

Finally, equine dermatomycoses were demonstrated in the R.A.V.C. laboratory. Methods of examination were discussed, with stress laid on the necessity of culturing all microscopically negative results of suspected ringworm. Interest was focused on the recent isolation of actinomyces from 2 equine scab samples of independent origin. Work in this particular organism as a pathogen of the skin of the horse is being undertaken in the laboratory.

Disciplinary Action by the Kennel Club.—*Concluded.*

"I have assumed that the words 'Lakeland Terrier Exhibit No. 75, Lakelynn Legal,' in the said complaint were and were intended to be a description of the terrier that was shown by the said Mr. Sills on the occasion specified therein and as then and there described. It follows therefore that I have assumed that I was entitled to find, if the evidence justified such a finding, that the terrier so shown and described was not in fact the terrier that is properly described as 'Lakelynn Legal.' This assumption is consistent with the arguments addressed to me by counsel on behalf of each of the parties concerned at the hearing referred to in the following paragraph.

"On Friday, March 3rd, 1961, at the premises of the Kennel Club, in the presence and hearing of the said Mr. Sills, I heard witnesses called on behalf of each of the parties and was addressed by counsel on behalf of each of the parties concerned.

"As a result of the hearing referred to I am satisfied that Mr. Sills committed a breach of the said regulations and was guilty of discreditable conduct as alleged."

At the meeting of the General Committee of the Kennel Club on March 21st, 1961, it was decided to suspend Mr. Sills until September 30th, 1965, the Committee taking into consideration the fact that Mr. Sills had already been under suspension for 6 months.

The day's proceedings concluded with a vote of thanks to Major Bishop, Dr. Rambourne, and the staff of the R.A.V.C. School and Stores.

CENTRAL VETERINARY SOCIETY

The annual "All-Day" meeting was held at the Royal Veterinary College, Camden Town, on April 13th, 1961, by kind permission of the Principal.

Victory Medal Luncheon

The meeting was preceded by luncheon at which the award of the Victory Medal for 1960-61 was made to Mr. S. F. J. Hodgman in recognition of his services to the profession. The President spoke of his valuable work in the field of small-animal medicine both in research and administration, and of his long contacts with the Kennel Club. Mr. Hodgman's brief and modest reply was warmly received by the company.

Scientific Meeting

The theme of the meeting was surgical technique; the President opened the proceedings at 2.30 p.m. in the Great Hall. Twenty-six Fellows and 13 visitors signed the attendance book. Apologies for absence were received from 15 Fellows.

Contributions

1. *Diagnosis and Treatment of some Surgical Conditions of the Dog's Thorax*, by R. G. Walker (Cambridge). This was a detailed account, illustrated by slides and specimens of the normal thoracic anatomy and the abnormalities seen in several disease conditions with particular reference to radiological diagnosis.

2. *Recent Developments in Equine Bone Surgery*, by E. J. Roberts (Newmarket). This described the structural and mechanical difficulties of bone-surgery in the horse and some ways in which they have been overcome. The contribution included case reports and a colour film showing the operation in a calloused splint.

3. *The Surgical Approach to the Nasal Cavity and Frontal Sinus of the Dog*, by Professor J. S. A. Sprcull (Edinburgh). This was a description of the operation to remove turbinates and ethnoids, the indications for this procedure, its virtues, and its limitations, illustrated by colour slides and film.

4. *The Surgical Treatment of Distal Radial Fractures in the Dog*, by W. B. Singleton (Knightsbridge). This was a comparison of methods of treatment and their variation with circumstance, illustrated by X-ray photographs.

5. *Personal Notes on Surgical Technique*, by Professor I. Aird (Post-Graduate Medical School, Hammersmith). An informal account of some personal preferences in men, material, and methods, in human surgery.

LANCASHIRE VETERINARY ASSOCIATION

The Annual General Meeting of the Association was held at the Department of Veterinary Pathology, University of Liverpool, at 2.30 p.m. on March 1st, 1961. The President, Professor E. G. White, took the chair, there were 21 members and 2 visitors present. Apologies for absence were received from 22 members, including the Honorary Secretary who was prevented from being present owing to pressure of work caused by the extensive outbreaks of foot-and-mouth disease in the district.

Minutes

The minutes of the last A.G.M. having been published, were taken as read, and signed.

Obituary

The President spoke of the death of 2 members of the profession: Mr. G. H. Locke, an Honorary Associate of the Association, and Mr. Hugh McKean, of Lytham who had been killed in a motor accident the previous day. Those present stood in silence as a token of respect.

The President read a tribute to G. H. Locke which he had received from Mr. Henry Sumner who was unable to be present at the meeting. Mr. Locke had been secretary to the Association from 1898 to 1912. A man of many activities and varied interests, he had qualified in 1896 at the new Edinburgh College which was later transferred to Liverpool. On the death of his father, Mr. G. H. Locke carried on the large horse practice in Manchester, the extent of which now seemed part of another world. He was a man of simple faith and outlook and his main thought was that it was his personal responsibility to do all in his power to live up to the highest tenets of the profession; he would often say that "life depends on what you give, rather than on what you get." He did indeed give freely; the fact that he was called upon to hold so many high offices was a measure not only of his desire and anxiety to serve but also of his ability to do so. A brusqueness of manner and directness of approach to all questions somewhat obscured a personality that was in fact kindly and considerate in the extreme. He was always seeking ways and means of helping others, particularly the young. "Ich Dien" was the epitaph he justly deserved for no one could be expected to do more than his best and to give his all. Harry Locke had done both.

Membership

The following gentlemen were nominated for membership of the Association:—

Mr. P. T. Worthington, Mr. A. S. Wallis, Mr. L. W. Kerruish, Mr. R. H. Hawkins, Mr. D. R. V. Crichton, Mr. J. E. Foley, Mr. G. B. Stubbs, and Mr. S. Angus.

The following gentlemen were elected members of the Association:—

Mr. F. P. Lawton, Manchester; Mr. F. P. McLeod, Chester; Mr. V. D. McNicol, Birkenhead; and Mr. J. C. Twist, Hartford.

Correspondence

Four letters from the B.V.A. were read:—

(a) On the suggested refresher course in Meat Inspection; this letter was referred to Council for further consideration.

(b) A request for more divisional news for THE VETERINARY RECORD; this was noted and it was agreed to supply suitable material when available.

(c) On services by sales representatives; mem-

bers were asked to notify the B.V.A. secretary of any such activities which infringed the veterinary field.

(d) On the Harry Steele-Bodger Memorial Prize Award; members and final-year students were invited to apply for this award.

Secretary's Report

This was read and adopted. The President paid tribute to Mr. Curtis for his excellent work.

Treasurer's Report

Mr. Shuttleworth presented his balance sheet, which had been duly audited. The President described it as most satisfactory—there was £30 in hand to carry forward from last year. The report was adopted.

Mr. Scott Anderson suggested that a small sum, say 5 guineas, be set aside annually for a prize to be given to a student in celebration of the Association's Centenary. This was referred to Council for further consideration as a worthwhile suggestion.

The Honorary Treasurer and Honorary Auditors were thanked for their work on behalf of the Association.

Elections

The following officers were elected for the year 1961/62:—

President: Mr. R. W. Dye; Vice Presidents: Professor E. G. White, and Professor D. L. Hughes; Honorary Secretary: Mr. P. E. Curtis; Honorary Treasurer: Mr. A. C. Shuttleworth; Honorary Auditors: Mrs. P. Bateson and Dr. G. O. Davies.

The following Members of Council were elected for 3 years:—

Mr. T. S. Anderson, Mr. A. L. Bragg, Mr. J. Gourley, Mrs. K. G. R. Kelly, and Mr. A. J. Wright. Mr. J. Adamson was elected for 2 years.

The following were elected as representatives of the Association on the B.V.A. Council:—

Dr. G. O. Davies, Mr. P. E. Curtis, Professor D. L. Hughes, and Mr. W. Tweed.

Mr. Harry Holroyd had had reluctantly to withdraw his name owing to pressure of work and his R.C.V.S. commitments.

Presidential Address

Professor E. G. White gave his Presidential Address on the "Future of the Veterinary Profession." He reviewed the various ways in which veterinary resources are now utilised and suggested ways in which they might be more usefully employed in the future when the number of veterinary surgeons available would be considerably increased. Disease control on the farm to be financed by state funds, more facilities for research, and closer co-operation with the medical profession on diseases of animals communicable to man were possible avenues of improvement, he suggested.

Induction of New President

Professor White welcomed Mr. R. W. Dye as the new President and invested him with the badge of office. Mr. Dye proposed a vote of thanks to Professor White for his good work during the past year, saying that he would do his best to be a worthy successor.

Reports of Representatives

The following reports were received:—

The Animal Health Trust and the Lancashire Milk Sub-committee: Mr. Proctor; the M.M.B. A.I. Centre, Tarporley: Mr. McWilliam; and the M.M.B. A.I. Centre, Whalley: Mr. Holroyd.

The representatives were thanked by the President for giving of their time to attend these meetings on behalf of the Association. The reports will be filed.

Other Business

It was proposed by Mr. H. Holroyd and seconded by Mrs. Kelly, that "We should accept Professor D. L. Hughes's offer to store for safe keeping the past minute books, cash books, and other documents of historical interest, relating to the affairs of this Association from its inception, in the Staff Library of the Department of Veterinary Pathology in the Faculty of Veterinary Science, Liverpool University." This was agreed.

The President referred to the Poultry Course for practitioners to be held in Liverpool on Wednesdays from May 3rd to 31st, 1961. Details had been circulated to all members who might be able to attend.

There being no other business the meeting was closed after the President had proposed a vote of thanks to Mrs. Kelly who had deputised for the Honorary Secretary at very short notice.

B.V.A. POULTRY REFRESHER COURSES

These courses, held in association with the Ministry of Agriculture at Wolverhampton, Weybridge, Stoke Mandeville and Reading, took place between May 1st and May 12th and proved to be a great success. All were well attended, and by common consent achieved a most valuable purpose. All the practising veterinary surgeons who were present felt their time had been spent to good purpose, and the whole undertaking was a happy augury for the success of other courses which the B.V.A. may decide to organise from time to time.

MR. ROBERT COULTHARD

Mr. R. S. Marshall writes:—

Many old colleagues will learn with regret of the sudden death at Toro, in Nigeria, of Robert Coulthard, on Saturday, May 13th. Joining the Royal Naval Air Service in 1917 he was shot down off the Belgian Coast on October 18th, 1918, but survived this mishap and graduated from the Royal Veterinary College, London, December 16th, 1926. He was appointed as a Veterinary Officer in Nigeria on August 17th, 1927 and remained in the service of the Department for the unusually long period of 29 years. Throughout his service he preferred field duties and refused offers of promotion on two occasions. His interest in, and knowledge of, game animals was such that on retirement he was immediately appointed as Nigeria's first Game Warden in 1956 which enabled him to spend all his time on the work he really loved. Many officials still in Nigeria will surely miss the wise counsel of such an experienced old timer.

News and Comment

POULTRY CONFERENCE AT PERTH

The importance of the diagnostic laboratory to the poultry industry was emphasised at a conference devoted to the economics of egg production held at Perth on May 11th. The conference, sponsored by Glaxo Laboratories Ltd., combined the interests of the veterinary profession, food compounder and egg producer within the industry.

Dr. J. E. Wilson related the work of the veterinary laboratory of the Ministry of Agriculture at Lasswade to problems found in the field. The complex nature of the modern disease pattern now made it impossible to arrive at a quick diagnosis. In order to avoid heavy losses and the unnecessary spread of disease, laboratory investigations should start at the first signs of illness or fall off of production, and not be delayed until deaths reach alarming proportions.

Many diseases had now become economically important, due rather to their effects on production and food conversion than to mortality.

Even early investigations might lose much of their effect in those diseases where virus excretion and liberation took place before the disease had become clinically obvious, so that subsequent prophylactic measures failed to control the outbreak.

Dr. Wilson also pointed out that husbandry and hygiene remained fundamentally important in the production and maintenance of healthy stock. The inclusion of specific antibiotics or chemotherapeutics often failed to give the desired results because of underlying faults in husbandry.

Dr. G. Clayton, lecturer in genetics at the Institute of Genetics in Edinburgh, stressed mortality rate in relation to bird selection—an aspect recognised by United States poultrymen in their assessment of controlled production costs.

Mr. G. A. Childs, discussing new advances in nutritional knowledge, emphasised one important recent development in the feeding of laying hens—that related to the calcium content of the ration and the calcium requirements of the laying bird. Recent work had suggested that the ration should contain approximately 3 per cent. of calcium, as it was now recognised that better quality shells occurred when the complete calcium requirement was contained in the ration, than when part of it was dependent upon the uptake of calcium in the form of free choice limestone grit or oystershell.

THE WILLIAM HUNTING AWARDS

The winners of this year's William Hunting Awards, which are made for the best clinical papers, in certain categories, published in THE VETERINARY RECORD, are as follows:—

Section 1. For the best paper, having a clinical application, by an author or authors in private veterinary practice: *First*, F. G. Startup, *Enzymic Zonulysis as an Aid to Cataract Surgery in the Dog. Second*, C. M. Gould and F. C. Grimes, *Milk Fever.*

Section 2. For the best paper by an author or authors in any branch of veterinary work who have been qualified less than 5 years, provided that the paper is based on clinical material obtained from practical field work and not on experimental material: *First*, D. R. Blackmore, *Some Observations on Dystokia in the Ewe. Second*, F. W. Sims, *Halothane Anaesthesia in Small-animal Practice.*

In addition to the above, for papers of merit, one year's subscription to "Modern Veterinary Practice" has been awarded to: R. S. Cowie, *Caesarean and Intussusception Operation in the Mare;* P. R. Greenough, *Dislocation of the Hip in the Cow;* J. C. MacKellar, *The Occurrence of Muscular Hypertrophy in South Devon Cattle;* T. Turner, *A Case of Hydroquinone Developer Poisoning in a Boxer Puppy;* and J. B. Tutt and T. G. Yarrow, *Surgical Interference in Dilatation of the Stomach of the Dog.*

THE REGISTER OF VETERINARY SURGEONS

The undermentioned gentlemen were admitted to membership of the Royal College of Veterinary Surgeons, and were registered in the Commonwealth List, on the dates indicated:—

Calley, Graham Chalmers, B.V.SC.(SYDNEY), c/o Dr. M. Calley, 108 Clifton Hill, London, N.W.8.

Purchase, Harvey Graham, B.SC.(RAND), B.V.SC. (PRETORIA), 239 Chesterton Road, Cambridge.

R.C.V.S. OBITUARY

We record with regret the deaths of the following members of the profession:—

WILLIAMS, Walter David, Roseworthy, Hillside, Caerphilly, Glam. Graduated from the Royal Veterinary College, London, December 21st, 1906. Major, R.A.V.C. (T.A.) (retired). Died February 1st, 1961.

MURES, Albert Arthur, Dunmore, Athol Road, Tankerton, Devon. Registered March 15th, 1950 as number 91 on the *Supplementary Veterinary Register*. Died January 8th, 1961.

PERSONAL

Marriage

MACARTHUR—NICHOLS.—On April 3rd, 1961, at the Friern Barnet Methodist Church, Gordon J. Macarthur, B.V.SC., M.R.C.V.S., of 93 Mantle Street, Wellington, Somerset, to Marion L. Nichols, of 51 Bawtry Road, Whetstone, London, N.20.

Births

ANDERSON.—On May 22nd, 1961, to Jean, wife of John Anderson, M.R.C.V.S., General Secretary of the B.V.A., of 7 Bishops Avenue, Northwood, twins, Fiona Janet and Ian Robert.

GRIME.—On May 17th, 1961, to Anne, wife of Philip Ayrton Grime, M.R.C.V.S., at Windsor, a son, brother for Charlotte.

COMING EVENTS

May

29th (Mon.). EAST YORKSHIRE CLINICAL CLUB. Meeting at the Talbot Hotel, Malton, 8 p.m.

30th (Tues.). SOCIETY FOR THE STUDY OF ANIMAL BREEDING. Meeting at the Royal Society of Medicine, 1 Wimpole Street, London, W.1, 11.30 a.m.

VICTORIA VETERINARY BENEVOLENT FUND. Annual General Meeting at the Royal Veterinary College, Royal College Street, Camden Town, London, N.W.1, 2.30 p.m.

31st (Wed.). LANCASHIRE VETERINARY ASSOCIATION. Meeting at the Pattern Arms Hotel, Warrington, 7.30 p.m.

LAKELAND VETERINARY ASSOCIATION. Meeting at the Royal Hotel, Kirkby Lonsdale, 6 p.m.

June

2nd (Fri.). NORTH WALES DIVISION. Meeting at Plas Coch, Park Street, Denbigh, 2. p.m.

ROYAL COUNTIES VETERINARY ASSOCIATION. Meeting at the new Centre for the Deaf and Hard of Hearing, Commercial Road, St. Ebbes, Oxford, 2.30 p.m.

7th (Wed.). SOUTH WALES DIVISION. General Meeting at the Langland Bay Hotel, Mumbles, Swansea, 2.15 p.m.

B.S.A.V.A. NORTH EASTERN REGION. Meeting at the Hotel Metropole, King Street, Leeds, 8 p.m.

8th (Thurs.). SCOTTISH METROPOLITAN DIVISION. Summer Meeting in the Golden Lion Hotel, Stirling, 2.30 p.m.

9th (Fri.). R.A.V.C. OFFICERS' CLUB. Annual Dinner at the Naval and Military Club, 94 Piccadilly, W.1.

10th (Sat.). R.V.C. 1952 Club's Annual Reunion. Dinner at "Ye Miller of Mansfield," Goring-on-Thames.

17th (Sat.). B.S.A.V.A. NORTH-WEST REGION. Meeting at the Queen Hotel, Chester, 7.30 p.m.

22nd (Thurs.). ASSOCIATION OF VETERINARY FOOD HYGIENISTS. Meeting at Forfar, Angus (to visit the new slaughterhouse). Members should assemble at the Municipal Buildings, Castle Street, 2.30 p.m.

September

2nd (Sat.). STREATLEY '58 CLUB REUNION. Annual Dinner at "Ye Miller of Mansfield."

3rd to 9th (Sun. to Sat.). 79th Annual Congress and Exhibitions of the British Veterinary Association at Oxford

7th (Thurs.). ROYAL VETERINARY COLLEGE ASSOCIATION. Annual Dinner during the B.V.A. Congress at St. Edmund's Hall, Oxford.

ADDRESSES OF DISEASE INFECTED PREMISES

The list given below indicates, first the date on which disease has been confirmed, followed by the postal address and local authority.

Anthrax

May 17th, 1961. E. Griffiths, Stocks Farm, Suckley, Worcester (Parish Suckley) (Cattle). WORCESTERSHIRE.

Fowl Pest

May 16th, 1961. G. D. Wilby, School House, Fakenham Maena, Thetford, Norfolk. Disease at: Butt Lane, Fakenham Magna, Thetford, Norfolk, WEST SUFFOLK.

May 16th, 1961. T. F. Mudge, 24 Yew Tree Way, Addington, Croydon, Surrey. SURREY.

May 17th, 1961. L. C. Pawson, Old Hall Farm, Pleasington, Blackburn, Lancs. LANCASHIRE.

May 17th, 1961. E. W. Cross, Oxenhouse Farm, Midge Hall, Leyland, Preston, Lancs. LANCASHIRE.

May 18th, 1961. J. Walmsley & Son, Hiltons Farm, Midge Hall, Leyland, Preston, Lancs. LANCASHIRE.

May 18th, 1961. Mrs. M. Ward, Cam House Farm, Midge Hall, Preston, Lancs. LANCASHIRE.

May 18th, 1961. F. J. Bowles, Hill Farm, Spooner Row, Wymondham, Norfolk. NORFOLK.

May 19th, 1961. W. H. Hargreaves, Oak Cottage, Gough Lane, Guide, Blackburn, Lancs. LANCASHIRE.

May 19th, 1961. Mrs. N. Joinson, 77, Earl Street, Clayton le Moor, Accrington, Lancs. Disease at Allotment, Hazel Avenue, Clayton le Moor, Accrington, Lancs. LANCASHIRE.

May 19th, 1961. Mrs. M. Walker, Charnleys Farm, Longridge, Preston, Lancs. LANCASHIRE.

May 19th, 1961. B. G. Fraser, Hillcrest, Chapel Lane, Holmeswood, Ormskirk, Lancs. LANCASHIRE.

May 19th, 1961. J. N. Hayhurst, Dairy Farm, Chipping, Preston, Lancs. LANCASHIRE.

May 19th, 1961. J. Bargh, Carters Farm, Gt. Eccleston, Preston, Lancs. LANCASHIRE.

May 19th. 1961. N. Salisbury, Clay Gap Farm, Out Rawcliffe, Preston, Lancs. LANCASHIRE.

May 22nd, 1961. W. B. H. Logan, Field Farm, Fakenham Magna, Thetford, Norfolk. WEST SUFFOLK.

Swine Fever

May 16th, 1961. D. Brown, Manor Farm, Wilshaw, Meltham, Huddersfield, Yorks. Disease at: Old Mill Farm, Wilshaw, Meltham, Huddersfield, Yorks. YORK, WEST RIDING.

May 16th, 1961. J. A. Johnson, 48 Front Street, East Boldon, Co. Durham. Disease at: Todstead, Long Framlington, Morpeth, Northumberland. NORTHUMBERLAND.

May 16th, 1961. E. G. Pryce, Hirrhos Hall, Llanerfyl, Welshpool, Montgomery. MONTGOMERYSHIRE.

May 16th, 1961. Mr. E. P. and Mrs. H. E. Lodder, Penchwe East, Llandissillio, Pembrokeshire. PEMBROKESHIRE.

May 16th, 1961. W. Walmsley, Prospect Farm, Haverah Park, Harrogate, Yorkshire. YORK, WEST RIDING.

May 17th, 1961. R. D. Adam, West Edge Farm, Gilmorton, Edinburgh. Disease at: Piggery at Forkenfield, Duddington Road West, Edinburgh. CITY OF EDINBURGH.

May 17th, 1961. A. Douglas, Devon Common Farm, Leven, Fifeshire. FIFESHIRE.

May 18th, 1961. F. J. Broom, Clapton Farm, Crewkerne, Somerset. SOMERSET.

May 18th, 1961. J. G. Pitt, 1, Roker Lane, Pudsey, Leeds. BOROUGH OF PUDSEY.

May 18th, 1961. J. Walker, The Thatches, Beelsby, Hatcliffe, Grimsby, Lincs. LINCOLN PARTS OF LINDSEY.

May 18th, 1961. H. Oelssner, 62, Lower Kenyon Street, Thorne, Doncaster, Yorks. Disease at: Piggeries, Bankside Farm, Selby Road, Thorne, Doncaster, Yorks. YORK, WEST RIDING.

May 20th, 1961. P. Jack, No. 15, Holding, Cochno, Hardgate, Glasgow, Dunbartonshire. DUNBARTONSHIRE.

May 20th, 1961. B. & E. J. Allen & Co., The Cafe, Quatford, Bridgnorth, Salop. SHROPSHIRE.

Letters to the Editor

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the B.V.A.

A Note on the Use of a Pulsometer

Sir,—At the recent B.S.A.V.A. Congress, J. Stock of the Royal Veterinary College demonstrated the use of a pulsometer. The interest shown by members has prompted the writers to communicate their experiences with a similar device.

The pulsometer used* (Fig. 1) consists of a microphone which is held on an extremity by an elastic strap. The microphone detects pulse pressure waves and the signals produced are fed to a battery-operated transistor amplifier, and indicated on a microammeter.

FIG. 1.—"Neopulse" pulsometer. (Photograph supplied by A.E.I. Ltd.).

Unfortunately the microphone will also respond to any movement which occurs either of muscles in the area, or between the microphone and the skin. Such movements will be detected and recorded on the meter, and these can readily become so troublesome as to obscure the pulse record. Respiratory movements and passive movements, such as occur during a surgical operation, can also give rise to false readings. Positioning the microphone on the tail would appear to offer some advantage since this site is less prone to movement.

It is possible to use this instrument in conjunction with a small sized occluding cuff, to determine the systolic blood pressure. This value is measured on an aneroid manometer connected to the cuff, and is read at the point when the meter shows that the pulse has just been obliterated. Under test conditions this method has shown good agreement (within 5 mm. Hg.) with the standard carotid cannula-mercury manometer method. Diastolic pressures could not be measured with any accuracy.

The sphygmomanometer cuff and the microphone should be separated by approximately 3 inches so as to avoid pulsations being transmitted *via* the cuff to the microphone. In our experience the tail appears to be the most suitable site for this application.

It is possible to record the signals of this machine on a pen recorder such the Ediswan type EPR, and Fig. 2 shows a typical trace obtained, along with a respiratory trace and an electrocardiogram. It should be noted that even after arterial occlusion has occurred a few pulses will be recorded during each inspiration. These are caused by a transient rise in systolic blood pressure.

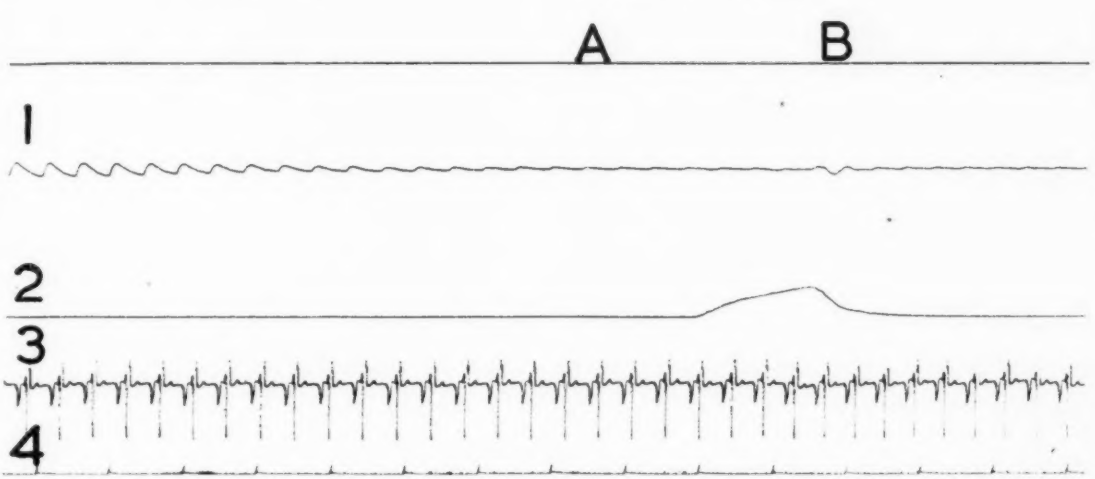

FIG. 2.—Records of pulse during measurement of systolic B.P. Tracings show; (1) Pulse, (2) Respirations, (3) E.C.G., (4) 1 sec. time marker. A. Disappearance of pulse signals as cuff is inflated. B. Reappearance of signals during inspiration.

* "Neopulse": A.E.I. Ltd., London.

We hope that with minor modification it may be possible to employ this compact, self-contained type of apparatus for the clinical estimation of blood pressure in animals.

Yours faithfully,
JAMES A. CAMPBELL,
DONALD D. LAWSON,
JOHN SANFORD.

University of Glasgow Veterinary Hospital,
Bearsden Road,
Bearsden,
Glasgow.
May 18th, 1961.

The Future of the Profession

Sir,—I am not one for entering into correspondence discussions as I feel this is a slow method of finding mutual agreement; but I do think I should comment on Mr. Hoddinott's letter.

He decries nationalisation, continues by emphasising how efficient the practitioner can be in his present state, and concludes by complaining about the dangers of unqualified persons threatening our livelihood. Surely, if we are as competent as we ought to be we have nothing to fear from any opposition, be it qualified or unqualified? These "thorns in our flesh" will prick us very superficially compared with the hunger pains in our bellies when the stock farmer has no further use for us.

I would agree with Mr. Hoddinott that at present we are not doing too badly at providing an adequate service, but the future I fear is ominous. To survive, the farmer to-day is forced to become more and more efficient. His profit return for capital outlay is outrageous by normal business standards. Disease in his stock is a major hindrance to his progress and where intensive husbandry methods are being ever increased, control and speed in recovery of illness will require the most up-to-date methods of treatment we can muster. The need for specialisation and elaborate equipment will be unavoidable, and so we must more closely integrate the laboratory and field workers. This state of affairs will never be attained with the present system. The practitioners cannot afford the facilities, and the V.I.O. centres are already inadequate through no fault of their own. Postage delays alone mean that often information is obtained too late for any immediate benefit. Also, the practitioner and scientist are too far apart to appreciate fully each other's position.

Nationalisation could set up veterinary hospitals throughout the country with clinicians and scientists under the same roof. There are many obstacles in a scheme such as this and perhaps there are other ways of achieving a similar end. I don't know, but until a better suggestion is forthcoming, I am certainly willing to consider it as a distinct possibility. Undoubtedly this veterinary service would cost the tax-payer a great deal of money but if the economy of agriculture were to counterbalance this it would be worthwhile.

Mr. Hoddinott's talk of the "already over-subsidised British farmer" and his estimates of the costs of a national veterinary service are, to say the least, unreliable. On the question of subsidies, the farmer has every right to expect incentives for aiming his production in the direction the country requires. The only trouble is that it is the "middle man" and not the producer who too often benefits from these subsidies. As to the cost of nationalising the profession I will await the opinions of professional economists.

When Mr. Hoddinott accuses the likes of me of thinking only of self-gain I wonder if it has occurred to him that we may be working only for the survival of our profession inside a more economic agriculture to benefit the whole community.

Yours faithfully,
W. T. MORROW.

290 Mansfield Road,
Nottingham.
May 16th, 1961.

The Future of Animal Husbandry in Overseas Territories

Sir,—Sir Thomas Dalling has shown how far the problem has gone since the conference called by President Roosevelt at Hot Springs, U.S.A., in 1943.

THE VETERINARY RECORD establishment has insufficient resources from which to produce a special F.A.O. number of THE VETERINARY RECORD for several years yet, say not before 1971.

Yours faithfully,
A. W. HART.

Fishers Tenement,
Tincleton,
Dorchester,
Dorset.
May 20th, 1961.

DISEASES OF ANIMALS ACT, 1950—GREAT BRITAIN
Summary of Returns of Confirmed Outbreaks of Scheduled (Notifiable) Diseases

Period		Anthrax	Atrophic Rhinitis	Foot-and-Mouth	Fowl Pest	Sheep Scab	Swine Fever
16th to 30th April, 1961		11	—	—	21	—	47
Corresponding period in	1960	12	—	1	99	—	43
	1959	15	—	1	34	—	53
	1958	12	—	2	19	—	50
1st January to 30th April, 1961		86	—	101	512	—	396
Corresponding period in	1960	102	—	11	1,085	—	361
	1959	98	—	2	294	—	390
	1958	67	3	110	242	—	361